

## **ABSTRACT**

An optical device includes, a first Mach-Zehnder modulator that produces a first output, and a second Mach-Zehnder modulator which produces a second output. A splitter couples the first and second Mach-Zehnder modulators. A combiner combines the first and second outputs. A phase shifter is coupled to the first and second Mach-Zehnder modulators. The first Mach-Zehnder modulator, second Mach-Zehnder modulator, splitter, combiner and the phase shifter are each formed as part of a single chip made of electro-optical material. Such two similar optical device integrated together with polarization combiner provide a two-polarization performance.